

## CLAIMS

We Claim:

1. A method for establishing reliable communications between two points in a mobile wireless network, wherein said first point comprises a first mobile wireless node, said second point comprises a plurality of mobile wireless nodes, and said first node cannot directly reliably communicate with any one of said plurality of nodes at said second point, said method comprising the steps of:

creating a neighbor list by each of said plurality of nodes;

transmitting a probe from said first node to said plurality of nodes;

forming a receive group, in reaction to receiving said probe, consisting of at least some of said plurality of nodes and based on the created neighbor lists and the received probe's signal quality;

choosing a controlling node from said receive group; and

receiving at said receive group, under the control of said controlling node, subsequent signals transmitted by said first node.

2. The method of claim 1 wherein said receive group disbands once communications with said first node are complete.

3. The method of claim 1 wherein said controlling node and members of said receive group are not predetermined.

4. The method of claim 1 wherein creating said neighbor list by each of said plurality of nodes further comprises the steps of:

probing periodically by each of said plurality of nodes to determine nearby nodes;

negotiating transmission parameters with nearby nodes to establish reliable communications; and

adding said determined nearby nodes to said neighbor list.

5. The method of claim 1 wherein said receiving step further comprises the steps of: transferring a representation of said subsequent signals received by each member of said receive group to said controlling node; and

combining said representations of said subsequent signals at said controlling node thereby establishing a reliable signal.

6. The method of claim 5 wherein said step of combining is performed through incoherent signal combining.

7. The method of claim 5 wherein said step of combining is performed through coherent signal combining.

8. The method of claim 7 wherein the coherent signal combining is based on antenna array systems.

9. The method of claim 1 further comprising step of transmitting second subsequent signals from said second point to said first node wherein said second subsequent signals originate from said controlling node.

10. The method of claim 9 wherein the step of transmitting said subsequent signals comprises:

- transferring representations of said second subsequent signals from said controlling node to each member of said receive group;
- transmitting said representations of said second subsequent signals to said first node;
- and
- combining said representations of said second subsequent signals at said first node thereby establishing a reliable signal.

11. The method of claim 10 wherein said step of transmitting said representations is performed by coherently transmitting said representations of said second subsequent signals.

12. The method of claim 10 wherein said step of transmitting said representations is performed by incoherently transmitting said representations of said second subsequent signals.

13. A method for establishing reliable communications between two points in a mobile wireless network, wherein said first point comprises a first plurality of mobile wireless nodes, said second point comprises a second plurality of mobile wireless nodes, said method comprising the steps of:

- creating a neighbor list by each of said plurality of nodes at said first and second points;

transmitting a probe from a first node at said first point to said second plurality of nodes;

forming a receive group, in reaction to receiving said probe, consisting of at least some of said second plurality of nodes, wherein said formation is based on said created neighbor lists and said probe's received signal quality;

choosing a controlling node from said receive group;

receiving at said first receive group, under the control of said controlling node, first subsequent signals transmitted by said first node;

transmitting second subsequent signals from said receive group, under the control of said controlling node, to said first node wherein said second subsequent signals originate from said controlling node.

14. The method of claim 13 wherein said receiving step further comprising the steps of:

transferring a representation of said first subsequent signals received by each member of said receive group to said controlling node; and

combining said representations of said first subsequent signals at said controlling node thereby establishing a reliable signal; and

wherein said transmitting step further comprises the steps of:

transferring a representation of said second subsequent signals from said controlling node to each member of said receive group; and

transmitting said representations of said second subsequent signals to said first node.

15. The method of claim 13 further comprising the steps, prior to transmitting said second subsequent signals, of:

transmitting a second probe from said controlling node to said first node;

forming a second receive group, in reaction to receiving said second probe, consisting of at least some of said first plurality of nodes, wherein:

said formation is based on said created neighbor lists and said second probe's received signal quality; and

said first node acts as controlling node for said second receive group;

receiving at said second receive group, under the control of said first node, said second subsequent signals; and

transmitting said first subsequent signals from said second receive group, under the control of said first node.

16. The method of claim 13 wherein communication between said first and second points is a single hop within a larger multi-hop network.

17. A method for operating a mobile wireless communications network comprised of a first plurality of mobile wireless nodes at a first point, a second plurality of mobile wireless nodes at a second point, wherein no two nodes between said first and second points can directly reliably communicate, wherein a subset of said first plurality of nodes have formed a first dynamic group consisting of a first controlling node, and wherein a subset of said second plurality of nodes have formed a second dynamic group consisting of a second controlling node, said method whereby said first controlling node reliably passes data to said second controlling node comprising the steps of:

passing a first representation of said data from said first controlling node to each member of said first dynamic group;

transmitting said first representations of said data from each member of said first dynamic group to said second point;

receiving said transmitted data at each member of said second dynamic group;

passing second representations of said data received by each member of said second dynamic group to said second controlling node; and

combining said second representations at said second controlling node to create a reliable signal.

18. A method for establishing reliable communications between two points in a mobile wireless network, wherein said first point includes a first mobile wireless node, said second point comprises a plurality of mobile wireless nodes including a second mobile wireless node, and said first node cannot directly reliably communicate with any one of said plurality of nodes at said second point, said method comprising the steps of:

creating a neighbor list by each of said plurality of nodes;

transmitting a probe from said second node to said first node;

forming a receive group, in reaction to receiving a response from said first node, consisting of at least some of the plurality of nodes, wherein said formation is based on said created neighbor lists;

collectively receiving at said receive group, under the control of said second node, first subsequent signals transmitted by said first node; and

collectively transmitting from said receive group, under the control of said second node, second subsequent signals destined for said first node.

19. A method for establishing reliable communications between a first point and a second point in a wireless network, wherein said first point includes an originating mobile wireless subset and said second point includes a plurality of mobile wireless subsets, said method comprising the steps of:

- 5       creating a neighbor list by each subset at said second point;  
      based upon said neighbor lists, forming a group consisting of a controlling subset and other subsets at said second point to receive and transmit data between said originating subset and said second point; and,  
      forwarding by each member of the group to the controlling subset of that group all  
10       messages received from said originating subset destined for said second point.

20. The method of claim 19 wherein said step of creating neighbor lists comprises the step of periodically transmitting from each subset at said second point a probe message to discover nearby subsets.

21. The method of claim 19 wherein said forming of said group is based on the signal quality of a probe transmitted by said originating subset and received by the subsets at said second point.

22. The method of claim 19 further comprising the step of forwarding by the controlling subset to each member of the group all messages to be transmitted from said second point to said originating subset.

23. The method of claim 19 wherein said first point includes a plurality of mobile wireless subsets in addition to said originating subset, said method further comprising the steps of:

- creating a neighbor list by each subset at said first point; and  
      based upon said neighbor lists at said first point, forming a second group consisting of other subsets at said first point with the originating subset receiving and transmitting data  
30       between said second point through said other subsets within said second group.